

# Nicholas Vadivelu

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Experience	<b>Uber ATG</b> • Research Intern <span>Jan 2020 – Aug 2020</span> <ul style="list-style-type: none"><li>Improved <b>object detection by 90%</b> (AP) and <b>motion forecasting by 22%</b> (L2) of a self-driving neural net under realistic positional error, significantly improving safety for future riders</li><li>Wrote a <b>first author paper</b> on the learned positional error correction system (under review at CoRL)</li></ul>
	<b>Google Brain</b> • Software Engineering Intern <span>May 2019 – Aug 2019</span> <ul style="list-style-type: none"><li>Unlocked K-FAC for <b>over 370,000 users</b> by implementing and open sourcing automatic support for arbitrary neural network architectures and integrating it into the Keras ecosystem</li><li>Enabled simple <b>multi-node, multi-GPU/TPU training</b> for users by incorporating <b>TensorFlow's</b> Distribution Strategy and efficient distributed operation placement</li><li>Designed, created, and open-sourced idiomatic, reproducible training recipes for users while carefully considering hyperparameter ranges, baselines, datasets, and models</li></ul>
	<b>NVIDIA</b> • Performance Software Engineering Intern <span>Aug 2020 – Present</span> <ul style="list-style-type: none"><li>Optimizing sparse BERT inference performance for <b>TensorRT</b> in <b>C++</b>, enabling a potential <b>50% reduction</b> in inference time, memory usage, and power usage for customers</li></ul>
	<b>John Hancock Financial</b> • Data Science Intern <span>May 2018 – Aug 2018</span> <ul style="list-style-type: none"><li>Achieved a <b>fraud detection rate of 63%</b> through designing an unsupervised ML model</li><li>Deployed 25 fraud identifying rules in <b>SQL</b> that <b>correctly flagged 100+ out of 20,000+</b> claims</li><li>Worked closely with clinicians to extract features from <b>5 new data sources</b> using <b>pandas</b></li></ul>
	<b>Sunnybrook Research Institute</b> • Software Developer Intern <span>Jul 2017 – Aug 2017</span> <ul style="list-style-type: none"><li>Improved MRI segmentation accuracy by <b>up to 80%</b> and reduced time to contour MRI scans from <b>~5 hrs to ~40 mins</b> by implementing techniques including watershed and clustering</li></ul>
Open Source	<b>PyTorch Ignite</b> : Improved performance by <b>up to 63%</b> by designing and implementing <b>async updates for distributed metrics</b> with tests and documentation
Leadership	<b>Data Science Club Lectures</b> : Designed and presented workshops about neural networks in <b>TensorFlow</b> , machine learning in <b>scikit-learn</b> , and data cleaning in <b>pandas</b> for <b>300+ students</b> <b>WATonomous Design Team</b> : Implemented real-time object detection in <b>Tensorflow</b> , <b>OpenCV</b>
Projects	<b>Competitive Pokemon Analysis</b> : Scraped, visualized, analyzed, and modeled Pokemon data with random forests, boosting trees, and markov chains in <b>pandas</b> , <b>scikit-learn</b> , and <b>matplotlib</b> <b>Thrive Life Simulator</b> : Created a <b>3D ray-casting game engine from scratch</b> for a dinosaur world simulation game in <b>Java</b> with <b>object-oriented design</b> and detailed documentation <b>Kaggle - Quora Insincere Questions Competition</b> : Achieved an F1 score of 0.669 using an LSTM with GloVe embeddings after training for the 2-hour limit
Education	<b>University of Waterloo</b> • Computer Science & Statistics (B. Math) <span>2017 - 2022</span> Cumulative GPA: 3.94/4.00 - Dean's List <ul style="list-style-type: none"><li>Research (Prof. Lin Tan): Proposed and implemented deep learning methods to identify bugs in code</li><li>Research (Prof. Pascal Poupart): Investigated practical second order optimization methods for NNs</li></ul>